



Figure 3. The path traced by the MODIS orbital axis (the banana-shaped curve) and its relationship to lunar trajectories. Azimuth is in degrees after the direction of full moon. Elevation is in degrees above the ecliptic. A typical lunar track is plotted, with the moon shown at 24-hour intervals. The annulus shows the portion of the sky seen by the MODIS space view during orbits on 18 Jul. Other dates indicate the motion of the center of the annulus (the MODIS orbit axis) over the course of a year.

MODIS - Lunar and Deep Space Maneuvers

| Maneuver | MODIS Preference |
|--|---|
| 20° Roll About X Axis During Spacecraft Night | |
| <ul style="list-style-type: none"> +20° Roll (lowers the cooler) enables view of deep space through the Earth Aperture @ Scan Mirror AOI of ~60°. Sequence requires < 10 minutes, providing ~3 minutes of data collection. Cold FPAs stay below the control temperature limit. -20° Roll (raises the cooler) ~ doubles opportunities to ~1/month to view the Moon through the Space View Port @ Scan Mirror AOI of 11.5°. | <p>Provides space view data at second AOI. Desired ~ 1/year.</p> <p>Desired ~ 6 times/year.</p> |
| Pitch Hold Starting at Eclipse | |
| <ul style="list-style-type: none"> Pitch-Hold: Requires ~ 18 minutes for Science FOV to cross above horizon for view of deep space. Cold FPAs rise above control temperature limit in <15 minutes. | Not useful. |
| Pitch Driven | |
| <ul style="list-style-type: none"> 12 minute driven pitch maneuver @ 6°/minute starting at eclipse allows ~1 minute Earth aperture view of deep space past Earth limb covering entire 55° AOI range before cold FPAs exceed control temperature limit (TBV). | Desired ~1/year. Requires further evaluation. |
| 120° Roll About X Axis During Spacecraft Night | |
| <ul style="list-style-type: none"> Allows 110° scan of deep space covering entire 55° AOI range with cold FPAs below the control temperature limit. Combined yaw maneuver required to view the Moon over entire 55° AOI range scanning from dark limb to the bright limb to avoid IR saturation on the dark limb. | <p>Alternative to driven pitch. Desired ~ 1/year</p> <p>Desired ~3 times per mission to adequately measure Scan Mirror reflectance (TBV).</p> |
| Lunar Cross Calibration Between AM and PM Spacecraft via 130° Roll | |
| <ul style="list-style-type: none"> Allows AM to view the moon at equal phase to PM view. | Essential. |